

Remarks

Applicant would like to thank the Examiner for the telephone interview on July 29, 2005. During the interview, the examiner suggested amending claims 29, 30, 33, 34, 37, 38, 41, 42, 49, 52 to recite only the device and the method steps of operation in functional language form to overcome the rejection.

Applicant has amended claims 29, 30, 33, 34, 37, 38, 41, 42, 49, 52 to recite only the device and the method steps of operation in functional language form as suggested by the Examiner.

Claims 1 and 64 have been amended to recite electrically variable DC multipole field.

Claim 68 is cancelled.

Such cancellations of and amendments to claims are only for the purpose of expediting the prosecution of this application and are not to be construed as an abandonment of any of the novel concepts disclosed therein.

The comments of the applicant below are each proceeded by related comments of the examiner:

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 29, 30, 33, 34, 37, 38, 41, 42, 49, and 52 stand rejected under 35

U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 29, 30, 33, 34, 37, 38, 41, 42, 49, and 52 recite method steps directed to a method of using the apparatus claim on which they depend. Note the relevant teaching from the MPEP regarding *Ex parte Lyell* cited below.

A single claim which claims both an apparatus and the method steps of using the apparatus is indefinite under 35 U.S.C. 112, second paragraph. In *Ex parte Lyell*, 17 USPQ2d 1548 (Bd. Pat. App. & Inter. 1990), a claim directed to an automatic transmission workstand and the method steps of using it was held to be ambiguous and properly rejected under 35 U.S.C. 112, second paragraph.

Such claims should also be rejected under 35 U.S.C. 101 based on the theory that the claim is directed to neither a "process" nor a "machine," but rather embraces or overlaps two different statutory classes of invention set forth in 35 U.S.C. 101 which is drafted so as to set forth the statutory classes of invention in the alternative only. *Id.* at 1551.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 29, 30, 33, 34, 37, 38, 41, 42, 49, and 52 stand rejected under 35

U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

As pointed out above, claims 29, 30, 33, 34, 37, 38, 41, 42, 49, and 52 recite both an apparatus and the method steps for using said apparatus and therefore overlap two statutory classes of invention.

Claims 29, 30, 33, 34, 37, 38, 41, 42, 49 and 52 are amended as suggested by the Examiner and therefore in allowable form.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 1, 4, 5, and 64 stand rejected and new claim 68 is rejected under 35 U.S.C. 102(b) as being clearly anticipated by Franzen et al. (USPN 5,468,958).

Regarding claim 1, Franzen et al. teaches an ion trap comprising a three-dimensional rotationally symmetric ring electrode (Items 3, 4, and 5) and two cap electrodes (Items 1 and 2 and Items 6 and 7) where the cap electrodes comprise a cone electrode (Item 2 for example), and a disk electrode (Item 1 for example) where the ring electrodes and cap electrodes generate dipolar, quadrupole, and octopole fields (Col. 3 Lines 59-68). Since the electrodes create the required fields recited in the claim, Franzen et al. satisfies the material requirements of Claim 1.

Regarding claim 4, the cap electrodes are divided into two main parts, denoted by Items 1 and 2. These parts have surfaces corresponding to the conic and spherical surface sections recited in claim 4. For example, the field emitting means of electrode 2 comprises a portion of a spherical surface at a plurality of locations, note the region immediately surrounding the aperture in Item 2 in Fig. 1 at the central axis of the trap and the taper associated with said Item. Secondly, the cap electrodes further comprise a portion having the shape of a conic surface, most notably in Fig. 1 Item 1, where a portion of the electrode sloping towards the aperture, but prior to a "step" on the electrode, has the shape of a conic section. Claim 4 further recites that the "cross sectional surface of the ring electrode consists of a portion of a circle and two straight lines jointed in orthogonal to the circle, the surfaces of the two cap electrodes facing toward the inside of said ion trap." This structure recites a rotationally hyperbolic electrode structure and conforms to the electrode structure featured in Fig. 1 of Franzen et al. Note further Col. 4 Lines 43-55.

Regarding claim 5, Franzen et al. teaches that the cap electrodes are divided into rotationally symmetrical sets of component electrodes (Col. 4 Lines 1-24).

Regarding claim 64, Franzen et al. further teaches an operating means (10) for ion mass analysis.

These grounds of rejection are respectfully traversed. "It is well settled that anticipation under U.S.C. 102 requires the presence in a single reference of ALL of the elements of a claimed invention arranged in the claim." *Ex parte Chopra*, 229 U.S.P.Q. 230 231 (BPA&I 1985), *Connell v. Sears, Roebuck & Co.*, 220 U.S.P.Q. 193, 198 (Fed. Cir. 1983).

Claim 1 calls for "a third means for generating an independent, electrically variable, DC multipole field". The important multipole field characteristic – "DC", acknowledged by examiner as patentable in April 5, 2005 office action which is copied below:

Regarding claims 3 and 7, the prior art fails to teach or suggest the application of a DC potential to a set of the component electrodes in the cap electrodes of a three dimensional ion trap. By contrast, the prior art most relevant to an ion trap having cap electrodes divided into multiple component electrodes, Franzen et al., utilizes only an RF signal to create dipole, quadrupole, and octupole fields in a three dimensional ion trap. Claims 43-44, 47-48, and 50-51 are similarly indicated as having allowable subject matter by virtue of their dependency.

is neither taught nor suggested in prior art including cited Franzen reference (US 5468958). Specifically: In Franzen reference (US 5468958), Franzen and Wang described a quadrupole ion trap with switchable multipole fractions in US. Pat. 5,468,958, but the multipoles are RF based. The multipole is generated by "applying a second RF voltages", thus the multipoles in Franzen reference are **RF multipoles**, while claim 1 as amended in present application calls for that the third means generates **DC multipoles**. Due to different (RF vs. DC) multipoles field characteristics in ion traps between Franzen reference and present application, ion movements in Franzen reference based ion trap and present application based ion trap will be different and be dominated by different theoretical equations as further described and explained in the specification of present application.

Since Claims 4, 5 and 64 make reference to preceding claim 1 which define further limitations for claim 1, accordingly, withdrawal of this ground of rejection is respectfully requested.

Regarding new claim 68, claim 68 is identical to claim 1 save the replacement of the term "means" in claim 1 with the term "circuitry" in claim 68. Since the term means encompasses the term circuitry and the elements for creating the required fields in the Franzen et al. prior art apparatus are in fact electrical circuits, the prior art anticipates the limitations of the newly added claim. Note further the discussion of claim 1 above.

Claim 68 is cancelled.

Allowable Subject Matter .

Claims 3, 7, 43-44, 47-48, 50-51, and 61 are allowed.

The following is an examiner's statement of reasons for allowance:

Claims 3, 7, 43-44, 47-48, 50-51, and 61 are allowable for the reasons set forth in the previous Office action and further with respect to claims 3, 7, 43-44, 47-48, and 50-51 because the Applicant has rewritten claims 3 and 7 to be in independent form. Claims 43-44, 47-48, and 50-51 depend on claims 3 and 7 and are therefore allowable by virtue of their dependency.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

The applicant acknowledges the examiner's indication that the claims 3, 7, 43-44, 47-48, and 61 are allowed.

Comments on statement of reasons for allowance

The applicant does not concede that there are not other good reasons for patentability of the claims discussed by the examiner, or of the other allowed claims, or of other claims.

All of the dependent claims are patentable for at least the reasons for which the claims on which they depend are patentable.

Canceled claims, if any, have been canceled without prejudice or disclaimer.

Any circumstance in which the applicant has (a) addressed certain comments of the examiner does not mean that the applicant concedes other comments of the examiner, (b) made arguments for the patentability of some claims does not mean that there are not other good reasons for patentability of those claims and other claims, or (c) amended a claim does not mean that the applicant concedes any of the examiner's positions with respect to that claim or other claims.

No fee is believed to be due.

Date 8-30-2005

7 Black Bear Lane
Westford, MA 01886

Respectfully submitted,

Yang Wang
Yang Wang